

Supplementary Information for: Low Temperature Scalable Deposition of Copper (I) Thiocyanate Films via Aerosol-Assisted Chemical Vapour Deposition

Lokeshwari Mohan^{1,2}, Sinclair R. Ratnasingham^{1,2}, Julianna Panidi³, Thomas D. Anthopoulos⁴, Russell Binions^{†,2}, Martyn A. McLachlan¹ and Joe Briscoe^{2*}

¹ Department of Materials and Centre for Plastic Electronics, Imperial College London, South Kensington, London SW7 2AZ, United Kingdom

² School of Engineering and Materials Science and Materials Research Institute, Queen Mary University of London, Mile End Road, London E1 4NS, United Kingdom

³ Department of Physics and Centre for Plastic Electronics, Imperial College London, South Kensington, London SW7 2AZ, United Kingdom

⁴ Division of Physical Sciences and Engineering, King Abdullah University of Science and Technology (KAUST), Thuwal 23955-6900, Saudi Arabia

[†]Author deceased

*j.briscoe@qmul.ac.uk

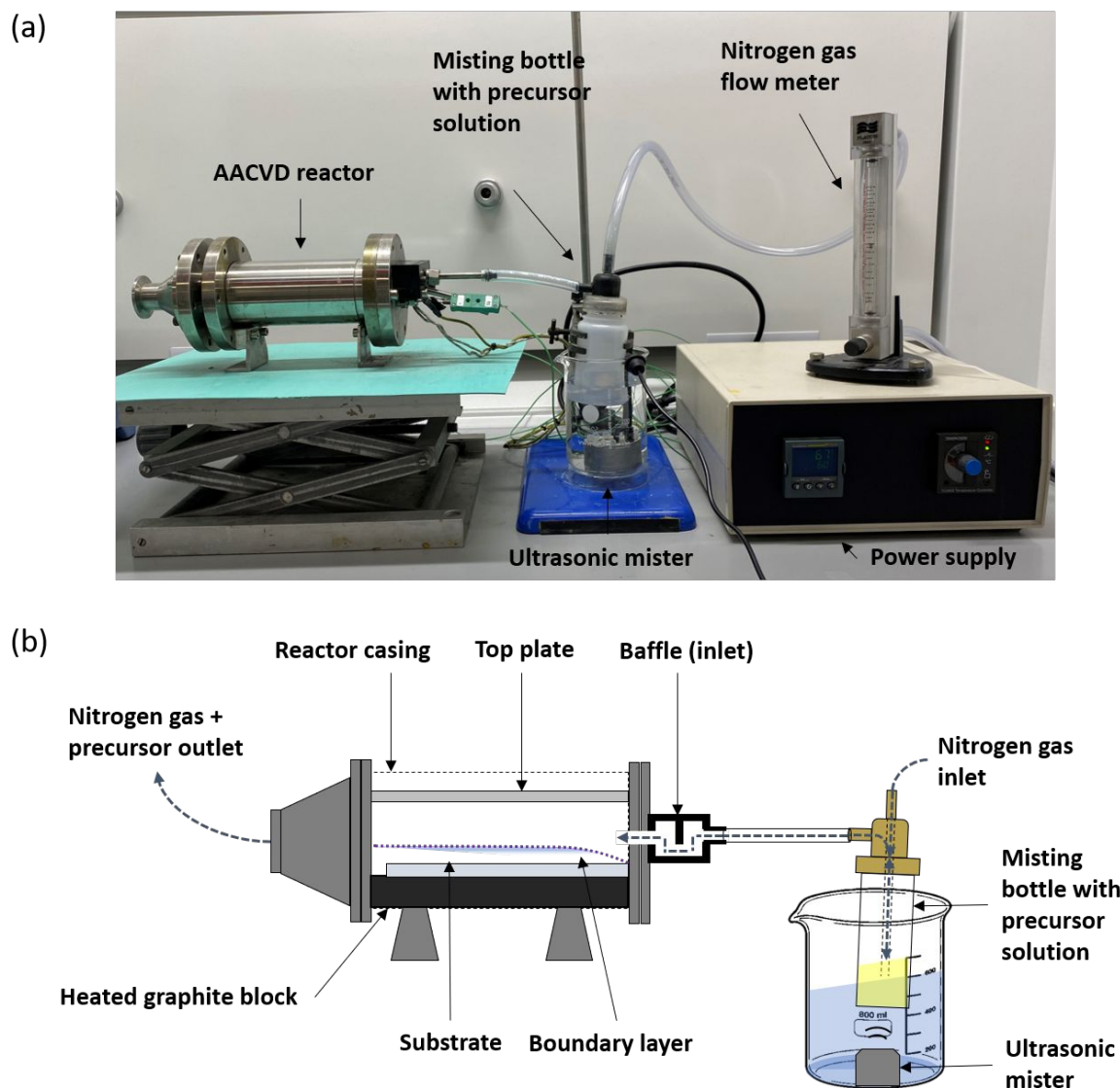
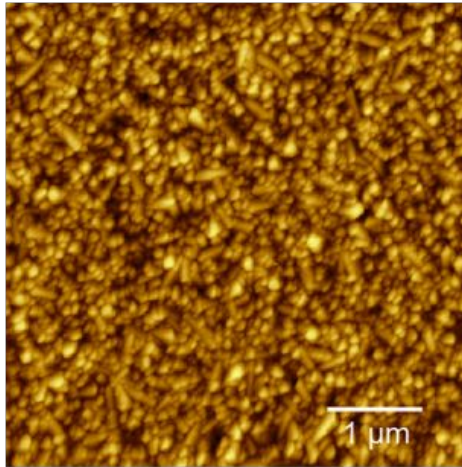


Figure S1- Photograph (a) and schematic (b) of AACVD experimental set-up.

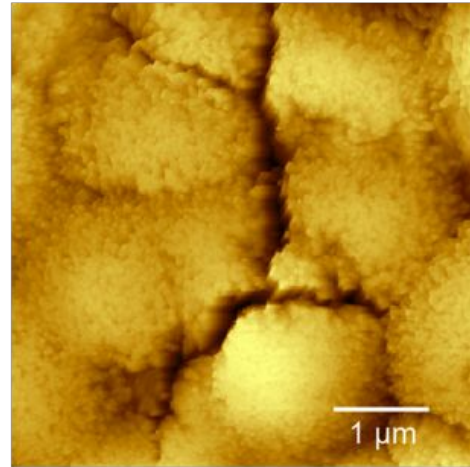
The aerosol-assisted chemical vapour deposition (AACVD) reactor is made of stainless steel and the baffle, precursor inlet, are made of naval brass. Both materials are resistant to copper (I) thiocyanate (CuSCN) and the solvent, diethyl sulfide (DES). The precursor aerosols enter the reactor via a custom-made baffle designed to promote laminar flow. The reactor chamber (17 x 6 cm) consists of a heated graphite block (15 x 5 cm) which the substrate is placed on. In this study, the temperature is controlled via the graphite block to ensure deposition is dominated at the substrate surface. The set-up is placed in a fumehood to prevent exposure to precursor aerosols.

FTO



RMS= 18.10 nm
Z= 120 nm

CuSCN on FTO



RMS= 92.34 nm
Z= 650 nm

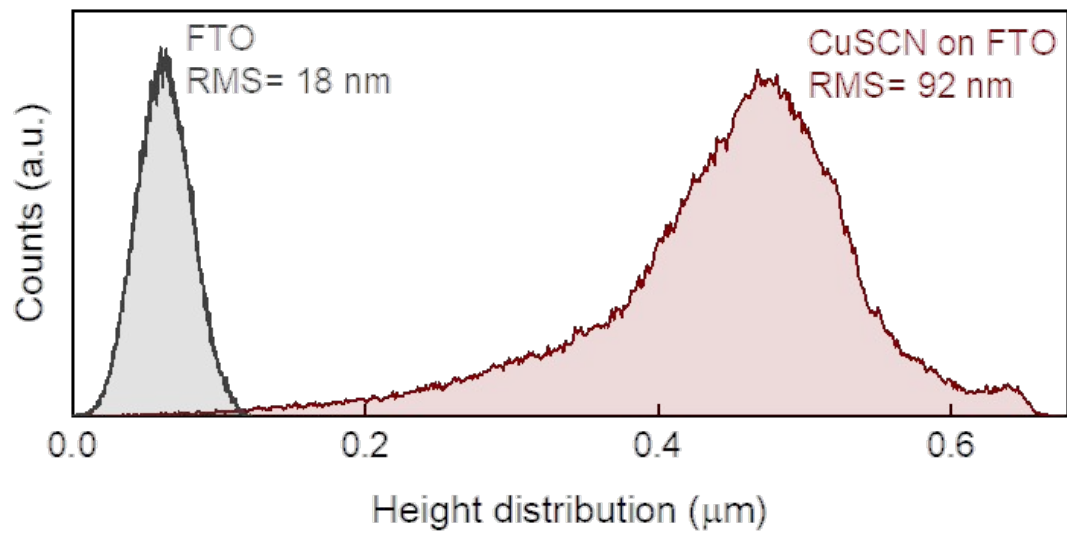


Figure S2. AFM images and their corresponding surface height distributions indicating root mean square (RMS) roughness of FTO (18.10 nm) and CuSCN on FTO (92.34 nm).

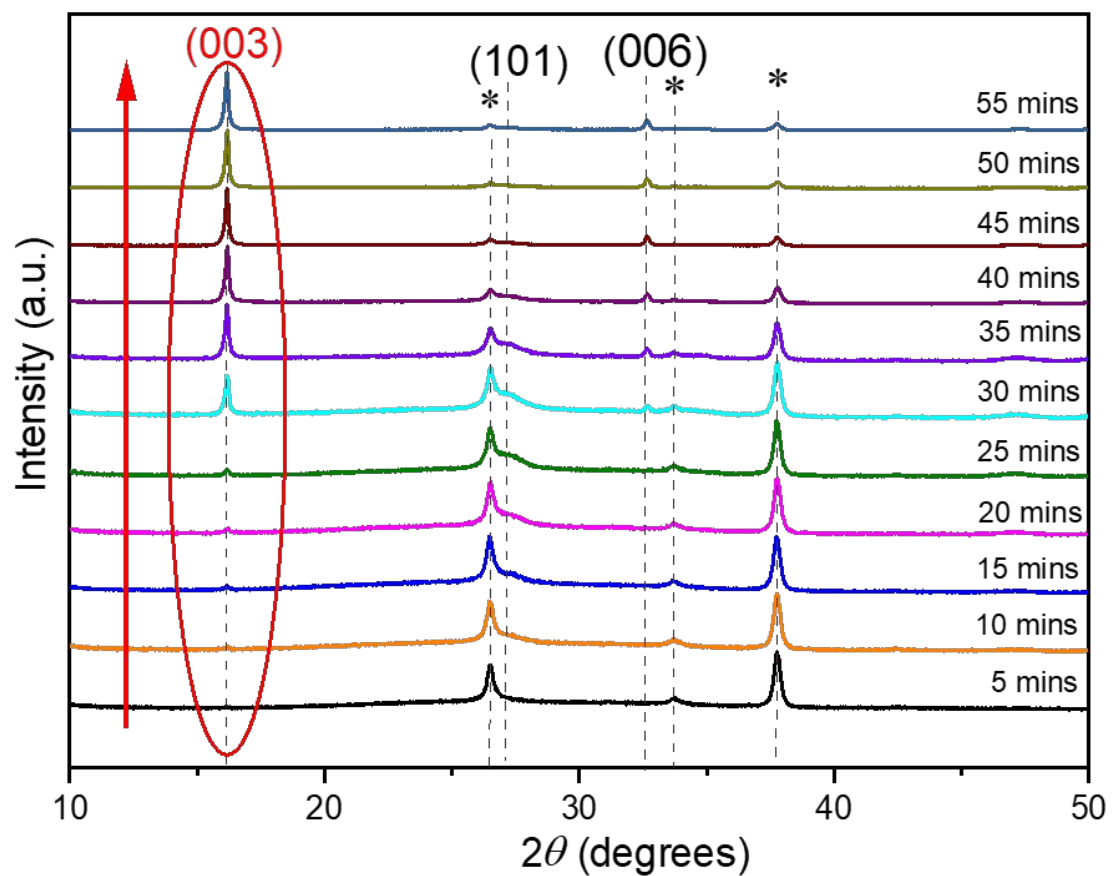


Figure S3. X-ray diffraction patterns of the film at 5-minute time intervals showing an increase in main (003) CuSCN peak with continual deposition. 25, 35 and 45 mg/ml follow the same trend with more CuSCN being deposited with time. Peaks labelled with an asterisk correspond to FTO.